



A healthy environment as a fundamental human right and a natural environment from the perspective of anthropocentric, biocentric or ecocentric paradigms

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Abstract

The protection and conservation of a healthy environment is a fundamental human right and an obligation for everyone. The aggressions to the environment practiced by human beings have caused damage to different species of life, to human health and to the ecosystem as a whole. The ineffectiveness of many of the proposals for environmental protection is probably associated with the utilitarian view that human beings have regarding other living beings and the natural environment – a distorted view linked to the anthropocentric paradigm. Scholars have proposed the adoption of the biocentric paradigm - which considers that all non-human living beings have an intrinsic value independent of human expectations, or the ecocentric paradigm - which considers the interdependence between all living beings and the natural environment as fundamental for the survival of life on the planet. Through the methodology of integrative review, the author analyzes the concepts presented by scholars in studies on the environment, and the central paradigms in their discussions, which mostly point to the need for evolution towards the biocentric or ecocentric paradigms.

Keywords: Climate change; Human health; Paradigm; Anthropocentric; Biocentric; Ecocentric

1 Introduction

1.1 Climate change, human health and environmental paradigms

Everyone has the right to a balanced environment and a healthy quality of life, which are - among others - listed as third generation, solidarity or fraternity rights, and protected by the Constitution of the Federative Republic of Brazil [1].

Despite the Constitutional provision and extensive environmental protection legislation - including those legal provisions expressed as results of International Treaties - threats and aggressions to Nature are growing and more frequent. Scholars on the subject admit that people's individual perceptions often see non-human living beings and the natural environment from a utilitarian perspective, based on the anthropocentric paradigm - which, by considering the human being as the center of interests and priorities, considers the other living beings as carriers of subaltern values and related to human needs [2]. From this perspective, the anthropocentric paradigm - which still prevails in societies in industrialized countries, and which models the actions of individuals and groups within the limits of interests and so-called priorities of human beings - is, to a certain extent, able to recognize in non-human living beings not intrinsic values, but those values relative to and derived from their potential applicability to meet human needs [3].

The perspective shaped by the biocentric paradigm would be fundamentally inclusive and egalitarian, considering non-human living beings as bearers of intrinsic values, regardless of their possible applicability to human interests and needs [4,5]; finally, the perspective provided by the ecocentric paradigm evolves human perception of the existence and values of non-human living beings and the natural environment, as endowed with values by themselves, regardless of possible

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human interests, and recognizes the interdependence between all components of the environment as a fundamental condition for the harmonious survival of the ecosystem [6].

Climate change is a matter of global concern, and its adverse effects could affect the entire world [7]. There is a growing body of scientific evidence pointing to the consequences of climate change on human health. The rise in temperature and sea level, associated with extreme events such as floods, affect water quality, and the emergence and exacerbation of diarrheal diseases [7]. The temporal and spatial distributions of communicable diseases - including those transmitted by vectors - tend to increase, due to changes in temperature favorable to this transmission, with repercussions on the dynamics of the communicability of these conditions[7]. The World Health Organization estimates that approximately 150,000 deaths occur annually in underdeveloped countries around the world, primarily due to climate change, with crop failure, flooding, diarrheal diseases and malnutrition [7].

Climate change comprises several pathways such as temperature, rainfall patterns, changes in the oceans, and air pollution - all of which have different impacts on health. Also, slower changes have different repercussions compared to extreme events. On the other hand, one cannot simply consider a given change as a new climate-related disease, or even typical climate diseases do not exist; on the contrary, climate change adds a certain factor to the various diseases that already exist and are sensitive to the climate, such as those of an infectious nature, non-communicable diseases, and injuries [8].

A study carried out in the State of Indiana – USA – points out that climate change is already being felt at local levels, with warmer winters and much more intense rain events. In that state, an assessment of the future impacts of climate change on human beings was carried out, using results from projections of advanced climate models for the present century. Such projections show a higher frequency of extreme heat events, with a 4-fold increase in the occurrence of days with "uncomfortable nights" conditions, with a strong impact on the cardiopulmonary health of the most vulnerable populations - especially the elderly, those individuals with pre-existing morbid conditions, children, and individuals with difficult access to cooling conditions. There is a tendency for warmer winters and floods, which may be predisposing factors for the increase in cases of diseases transmitted by vectors, such as mosquitoes. It is also estimated that high heat and humidity will lead to deleterious effects on elementary systems, with the proliferation of mycotoxins and bacteria[9].

To understand the health consequences of climate change, temperature and precipitation variables are considered, both independently and in interaction. It is known that environmental temperature affects the cardiovascular system, through heat stress, and also affects the respiratory system by the greater length of season-related periods of allergies, as well as by exposure to carbon monoxide, and increased production of particles.[9]

Over the past few decades, air pollution has been identified as a leading cause of morbidity and mortality in the United States and around the world, with approximately 200,000 premature deaths in the United States being estimated to be caused by fine particles air pollution and about 10,000 deaths are caused by ozone pollution every year [9]

In Brazil, the right to health - also provided for in article 196 of the Constitution of the Federative Republic of Brazil - establishes that health is everyone's right and the State's duty; the State must - including through social and economic measures - provide for the reduction of the risks of illness and the occurrence of other injuries [10]; such right does not materialize when the damages caused by the devastation of the environment are not adequately combated by State actions, and the preventive conservation of the so-called natural resources is not ensured in a large part of the Brazilian territory.

In similar terms, the Brazilian Magna Carta provides in its article 225 that a healthy environment is a right for all, a common good and fundamental to a healthy quality of life; such imperative – despite all its logical and scientifically based content – coexists with a reality of perverse aggressions of anthropogenic origin that squander Nature's resources, destroy ecological niches, expose entire populations to the ills of environmental disasters, and climate changes with catastrophic potential, frankly harmful to life and health.

That said, it requires a deepening of scientific thinking about the reality of aggressions to the environment, and the passivity with which entire populations coexist with environmental exploitation motivated by the ignorance and greed of an apparent minority, despite the diffuse damage caused to the majority of the population due to the depletion of natural spaces and environmental resources. Scientific thought needs to deepen the understanding of how the perverse behavior of environmental aggressors occurs, in coexistence with the morbid passivity with which populations watch the deterioration of living conditions and planetary housing. This study seeks to understand the foundations of scientific concepts presented in the analyzed studies, and how they relate to the prevailing environmental paradigms – the

anthropocentric, the biocentric and the ecocentric. Thus, the main objective of this work was a comprehensive interdisciplinary analysis of the scientific production on how human beings deal with the environment, on aggressive acts and facts against non-human living beings, natural resources and the ecosystem, and the values expressed by a significant number of human beings in relation to non-human living beings, natural resources and the ecosystem.

2 Methodology

An integrative review was carried out on the subject of this study - namely: climate change, its repercussions on human health, and the possible link of the analyzed studies to anthropocentric, biocentric or ecocentric paradigms.

As a search and selection strategy, the Portal of Periodicals of CAPES – (Commission for the Improvement of Higher Education Personnel) of the MEC (Ministry of Education and Culture) - virtual library that gathers and makes available to Educational and Research Institutions in Brazil for qualified scientific production; access to the Periodical Portal was through CAFE (Federated Academic Community), through identification by username and password, which allowed access to the content of the Portal available to the University Institution to which the author is affiliated. Pubmed (online database, developed and maintained by the National Library of Medicine – NLM) and SciELO (Scientific Electronic Library Online) databases were also used.

The descriptors used – considering that most scientifically relevant articles are published in English – were as follows: *climate change*; *human health*; *paradigm*; *anthropocentric*; *biocentric*; *ecocentric*; between the two main descriptors, *climate change* and *human health* – the connective *and* was used; for the other descriptors, the *or* connector was used in order to expand the opportunity to include more studies.

To the search command with the descriptors listed above, 75 articles were returned; a filter was applied to select articles published between 2011 and 2021 – 51 articles returned; among the latter, those that have been peer-reviewed as a requirement for publication were selected – which resulted in a final number of 44 articles; these 44 remaining articles, once read, resulted in 30 of them not having thematic relevance to the focus of the study – in other words – they didn't involve in the analysis as main issues: climate change produced by aggressions to the environment; human health affected by environmental and climate changes; and finally, an evident relationship with the evaluative perspective linked to anthropocentric, biocentric or ecocentric paradigms.

About the 14 studies that remained, each one in itself was analyzed in relation to the aforementioned theme, in the sequence in which they were listed on the search platform – by relevance; once analyzed, these studies are grouped in the *Results and Discussion Section*, considering the way in which each study shares in its texts a greater affinity of concepts with each of the studied paradigms.

3 Results and discussion

The selected articles – 14 – were analyzed according to the methodology and objectives explained for the present work, and are presented in a grouped way according to the most relevant environmental paradigm understood in their argumentation: the anthropocentric, or the biocentric, or the ecocentric; the arguments and concepts understood in each study and related to environmental paradigms are briefly explained. In the descriptive part of the discussion, the titles of the articles are cited in the body of the text, with the aim of simplifying the reader's understanding of the meanings presented in the referred studies.

3.1 The Relevance of the Ecocentric Paradigm

The article titled *Social dreaming and ecocentric ethics: sources of non-rational insight in the face of climate change catastrophe* [11], it has the format of a theoretical essay; the problem-situation described considers that the social dream could have a significant role in future educational processes, to prepare and tune a given civilization for the understanding in deep psychophysical terms that - far from an anthropocentric perspective - the entire structure of evaluation of the world could simply cease to make sense (fundamentally in the example described – regarding the imminent environmental catastrophe that lies ahead). The identified paradigm can be considered non-anthropocentric; at an ideal level, one can understand that the ecocentric paradigm is placed in relevance.

The article titled *The need for ecocentrism in biodiversity conservation* [3] takes the form of a theoretical essay; it argues that environmental damage of anthropogenic origin has not been resolved in part due to anthropocentric ethical premises and moral rhetoric employed in thematic meetings. It argues that there must be progress in the premises of biodiversity conservation that does not only take into account human interests, since species and ecosystems have their

own values, regardless of whether they serve human interests or not. Reading the text, one can understand that the identified paradigm is clearly ecocentric.

The article identified as *Technology and the forces of nature: A lesson of humility calling for ecocentrism* [12], it is a theoretical essay; it addresses the discussion on environmental catastrophes, with emphasis on those of a radioactive nature; the study concludes that it is important to adopt the ecocentric paradigm as a way of facing threats to the ecosystem, in addition to highlighting how such an approach puts the human being [and other species] back in the right place, neither above nor to the side nor outside the ecosystem, but within it; the study highlights that the ecocentric paradigm must be understood as the basis for a sustainable life and for providing services to humanity. It also urges the understanding that the lesson to be learned in the face of the forces of nature can be a move away from the dominant anthropocentric paradigm - and towards an attitude that integrates all actors, in a movement driven by knowledge and adequate efforts of research. The paradigm highlighted – anthropocentrism – with a critical view of it – allows the reader to understand the importance of the necessary migration to the ecocentric paradigm.

The article *Integrating Deep Ecology and Adaptive Governance for Sustainable Development: Implications for Protected Areas Management* [13], it is a theoretical essay; the study develops the thesis that in the relationship between human beings and the environment, many criticisms arise from the concept of sustainable development mainly due to its anthropocentric approach, where the other environmental dimensions that include the various living species and the natural environment are faced within a utilitarian perspective in favor of human beings. As an alternative to a new policy orientation in the interactions between human beings and the environment, the study proposes the concept of deep ecology that emphasizes the priority of recognizing the intrinsic values of all living things, as well as the cultivation of ecological and cultural values, avoiding taking a reductionist approach to knowledge, and promoting long-term sustainability, with respect for culture and ecology. Therefore, it can be understood that the anthropocentric paradigm is criticized and the alternative of the ecocentric paradigm is pointed out as a long-term solution directed towards a sustainability model.

The study titled *Beyond multispecies ethnography: Engaging with violence and animal rights in anthropology* [14] it is also a theoretical essay; the problem situation addressed is that anthropologists have historically carried out mediation between communities that suffer discrimination and “strange” individuals, when they help to form public opinion through the work of defending the rights of those communities. It is suggested that anthropology also engages with the various ways in which humans and non-humans are involved in broader ecological relationships, which would converge in interspecies ethnography, capable of critically and ethically discussing the use of non-humans beings in medical experimentation, in food production, and in industry, in cases of habitat destruction, and complex cases of violence against non-humans beings. Thus, it is suggested that Anthropology engage in a more radical perspective, involved with deep ecology, animal rights, animal welfare and ecological justice. On the paradigm in evidence: the predominance of the anthropocentric perspective is criticized, the engagement in deep ecology is proposed, which can be understood as related to the ecocentric paradigm.

3.2 Evolution to the biocentric or ecocentric paradigm

The study titled *Framing the ecosystem concept through a longitudinal study of developments in Science and policy* [15], it also has a theoretical essay format; the problem situation addressed brings the argument that scientific research is generally based on implied value judgments, and the scientific community does not make them explicit; environmental policy documents are also characterized by clear expressions of value, management-oriented, and centered on human interests. The study also finds that most policy documents and scientific publications have centered on humanity to various extents, and in rare cases, the biocentric or ecocentric paradigms have been applied, not being identified in binding regulations. Just in case policy formulations are done with a different structure, different environmental management could be expected. Regarding the environmental paradigms, it can be understood that the study is a critique of the anthropocentric model and that an innovation is proposed with the inclusion of the biocentric or ecocentric paradigm.

The article *The Health Reframing of Climate Change and the Poverty of Narrow Bioethics* [16] – it is a study in the form of a theoretical essay; the problem situation addresses the relationship between human health and climate change. First, it discusses the thesis that anthropocentrism is a worldview that places human beings and their interests at the center of attention; the study also admits that this centrality can be literal or spatial, just as the geocentric theories of the universe assumed centrality in the history of thought in the western world, and contains a deontic character, as this paradigm assumes that human beings would be the only ones with non-instrumental moral value, that is – any non-human entity would have moral value instrumentally, in its relation to human well-being. This study also considers that research ethics are often practiced through a commonly narrow anthropocentric bioethics. Second, it explains that

many human activities, with more emphasis on those involving the burning of fossil fuels, emit greenhouse gases such as carbon dioxide into the atmosphere. These gases, in turn, retain solar radiation causing global warming, which is causing climate change with devastating effects on human health, repercussions on lifestyle habits and on the world as we know it, which leads scientists to the development of mitigation strategies. It is admitted that there is a lack of political, cultural and economic will to make significant changes in human habits that are promoting the planet's warming, and such mitigation strategies fail to promote the interruption of greenhouse gas emissions and its consequences on global warming. The anthropocentric bias leaves ethical analyzes incomplete; therefore, a proposed alternative would be Biocentrism – according to which all species of life would have a morally considerable, and not merely instrumental value; however, depending on how different forms of life are classified, such Biocentrism could be compared to *Inclusive Anthropocentrism*. Evolving on the issue, a greater alternative would be *Ecocentrism*, which admits that ecosystems in their entirety – and not just individual organisms – would be morally considerable entities, having in themselves a final moral value. In conclusion, the study states that bioethics should be expanded to include principles not limited to anthropocentric values; from what has been exposed, it is understood that the article criticizes the anthropocentric model, defending the inclusion of the biocentric and/or ecocentric paradigms.

The study titled *Managing climate change: a view from deep ecology* [17] it is a theoretical essay; on the problem situation addressed, the study discusses the thesis presented by the Norwegian philosopher Arne Naess in the year 1973, on the so-called “*surface ecology*” and “*deep ecology*” in the text “*The Shallow and the Deep, Long-Range Ecological Movement: A Summary*” in *Inquiry* [Naess 1973]. In his study, Naess made a distinction between *shallow* and *deep ecology* movements: *shallow ecology* would be characterized by the central goals of health and wealth for people in developed countries (thus fundamentally human interests, and ranging from pollution to resource depletion). The study also states that already in relation to *deep ecology* Naess described a movement with seven main characteristics: a relational image of the total field, biospheric egalitarianism, diversity and symbiosis, anti-class posture, efforts against pollution and depletion of resources, complexity, non-complication, and local autonomy and decentralization; the study goes on to say that upon retiring from his activities as a professor of philosophy, Naess dedicated his philosophical knowledge for several years of his life to environmental and ecological issues, in the so-called field of “*ecosophy*”. The study concludes by proposing that deep ecology should provide a relevant point of view in addressing climate issues, and such a point of view could be fruitful from some perspectives, namely: the long range, the holistic consideration, the consideration of intrinsic values, the moderate interference in the surroundings, valuing biodiversity, anti-consumer behavior, carrying out systematic analysis of norms and values, and practical relevance. Finally, the approach motivated by deep ecology would be capable of reducing the damage generated against humans and non-humans beings, with an extension and deepening of care for the entire biodiversity. From what was discussed, it is understood that the *deep ecology* paradigms – theoretical foundation adopted in the essence of the study – would be mainly the biocentric paradigm and, ultimately, the ecocentric one.

The article *Interspecies Sustainability to Ensure Animal Protection: Lessons from the Thoroughbred Racing Industry*: [6] it is a theoretical essay. The thesis developed in the study explains that interspecies sustainability urgently needs to evolve to include wildlife, animals labeled as “*cattle*”, companion animals and animals used in sport and entertainment or in any other way by humans, so that they are not disregarded in the sustainability transition. It considers that there is a great gulf between intraspecies sustainability and the use of animals by industry or other forms of exploitation by men that compromise the well-being and lives of these animals, and this exploitation tends to be continuous and increasingly refined. The study also argues that, in general, issues relating to the welfare and protection of animals are not discussed based on medical, biological or technological aspects, but on the sociocultural and political domains, which would belong to the anthropocentric paradigm. From what is seen in the argumentation, it can be deduced that the highlighted paradigm is the anthropocentric one; a critique of it is established in the text, in such a way that a suggestion of evolution for the biocentric or ecocentric paradigm can be understood.

The study *Cultivating a Value for Non-Human Interests through the Convergence of Animal Welfare, Animal Rights, and Deep Ecology in Environmental Education* [17] it is also a theoretical essay; it addresses the problem-situation that the instrumental attitude towards nature has not been sufficient to protect most of the vulnerable elements of the environment, nor to deal with the ideal of animal welfare or the rights of animals; as an alternative, it argues that environmental education and sustainability education must include in their content the integration of animal rights, animal welfare and deep ecology, and recognition of the diversity of all species; such an attitude would make education more critical and expose the shortcomings of mainstream anthropocentric ethics. From what was discussed, it can be understood that the study highlights the anthropocentric paradigm, criticizing its limitations, and pointing to the biocentric and ecocentric paradigms as valid and better alternatives.

The article titled *Non-Human Animal Abuse and Wildlife Trade: Harm in the Fur and Falcon Trades*. [18] it is also a theoretical essay; in the problem-situation addressed, the discussion considers that, until recently, criminology ignored

the violence and abuse that non-human animals suffer, and the immense variety of forms in which they occur; criminology habitually ignored violence perpetrated against the environment, with destructive and harmful human behavior, which has changed with the development of so-called green criminology. The article discusses the abuse that non-human animals suffer in the context of the wildlife trade, and within the perspective of non-human animal rights, - that is one of the perspectives adopted in the field of so-called green criminology, which opens a criminological investigation in matters formerly ignored in the field of justice. It argues that anthropocentrism is the current position of most legal frameworks and ethical approaches – in which non-human animals and nature are seen as merely instrumental, and profit and human consumption are prioritized over environmental well-being. – what should be modified by adopting the biocentric or ecocentric paradigms. In relation to biocentrism – the health of other non-human species would take precedence over human interests, something difficult to occur within the standard of anthropocentric values; as far as ecocentrism is concerned, this would be the balance between the instrumental position (anthropocentric paradigm) and the intrinsic value of non-human life and the natural environment (biocentric paradigm). Therefore, based on the discussion presented, it can be understood that the study critically analyzes the anthropocentric paradigm - and proposes the adoption of the biocentric and ecocentric paradigms.

The article *Green Criminology and Environmental Crimes and Harms* [19] it is also a theoretical essay and the problem situation analyzed is the so-called *Green Criminology* – which has flourished since the 1990s. The anthropocentric perspective is centered on human being, who is seen as separate, as if human beings were not part of the ecosystem; in this context, the non-human portion of the ecosystem is understood to be structures that meet human needs. The biocentric perspective sees the human being as one of the species among living beings – as much as other species of living beings – and each non-human species will continue to have its intrinsic value – regardless of how much human beings consider their existence or existential values. The ecocentric perspective admits that human being is neither above nor below the natural environment, being in intimate interconnection with it; for having the ability to produce actions that can profoundly interfere with the environment, human being also has the responsibility that such actions respect the ecosystem's limits in dealing with their effects. The concept of “environmental justice” would refer to the amount of resources that human beings want and need – within an anthropocentric perspective; the “justice of species” – within a biocentric perspective – would tend to see all non-human animals that are harmed by the human species as victims; “ecological Justice”, on the other hand, refers to the relationship between human beings and the rest of the biosphere, the natural environment – including the animals and plants that are part of this biosphere. Analyzing the paradigms in relief – one can understand that the three are discussed – anthropocentric, biocentric and ecocentric – with the evident superiority of the latter for a healthy environment; therefore, a suggested option for the biocentric or ecocentric paradigms is presented.

3.3 Emphasis on the Anthropocentric Paradigm

The study entitled as *The Malicious Effects of Existential Threat on Motivation to Protect the Natural Environment and the Role of Environmental Identity as a Moderator* [20] also follows the theoretical essay format; it argues that extreme weather conditions resulting from aggression to nature are associated with a sense of existential threat, lack of control and threat to basic living conditions; paradoxically the existential threat can reduce the preoccupation with the biosphere and nature; associating the existential threat with human interests and identities can eliminate the malicious effect of the existential threat on concern for the environment. From what was discussed, it can be understood that the paradigm identified in the study was anthropocentric – as an anchor for pragmatic concerns with environmental issues.

The article *Rights-based Approach: The Hub of Sustainable Development* [21] it is also a theoretical essay; it addresses the problem-situation that there is a rights-based approach to sustainable development, which is in a frank evolutionary process; there are also many specific visions of environmental justice, whether using the anthropocentric, biocentric or ecocentric paradigm, deep ecology, etc. An approach has grown in recent years that considers that the principles of sustainable development have not produced significant changes in terms of socioeconomic and cultural aspects; ecological exploitation and degradation continue to grow, and this has led environmental activists and academics to use the strategy of giving a human face to the environment, in such a way that aggressions to the environment are considered violations of the right to life. From what is discussed in the study, it can be understood that the central paradigm of the discussion – the anthropocentric one – is seen more broadly – with the inclusion of the values of non-human lives and the natural environment.

From the above, 05 articles clearly defended the ecocentric paradigm; 07 articles criticized the anthropocentric paradigm, suggesting the option for the biocentric or ecocentric paradigms; only 2 studies maintained the critique around the anthropocentric paradigm, but without a clear suggestion of evolution towards biocentric or ecocentric paradigms. These results somehow show conceptual clarity about the need to move away from a paradigm that has long

immobilized human beings around themselves - the anthropocentric paradigm - misunderstanding non-human living beings and the natural environment as resources available for their needs and interests.

4 Conclusion

This integrative review aimed to analyze the discourse presented in scientific works that addressed the thematic approach involving climate change, human health and the environmental paradigms. The discourses studied revealed a relative homogeneity that identifies the anthropocentric paradigm as dominant in most contemporary industrialized societies; such an anthropocentric paradigm somehow “immobilizes” human beings in relation to environmental care and protection, as this paradigm brings human beings a utilitarian perspective in relation to non-human living beings and to the natural environment. It is also identified that the predominant human view of non-human living beings - with a frankly mistaken concept of subordination and inferiority in terms of values and rights - is a source of injustice, mistreatment, in addition to causing harm and suffering to these living beings, with damage to species and to the ecosystem as a whole. The need for an ecocentric approach is highlighted so that biodiversity conservation is achieved, as well as an emphasis on animal welfare, the rights of non-human living beings, and the concepts of deep ecology being applied in research projects, in governance policies as well as in the management of climate change resulting from anthropogenic environmental aggressions. Finally, what permeates the various analyzes presented is a preoccupied and disturbing view of the aggressions that are practiced by human beings against the non-human living beings, the natural resources and the ecosystem as a whole; also the harmful consequences of these aggressions for human health, survival and well-being of all species, and for the balance of the ecosystem. In a relevant way, the need to evolve from the anthropocentric paradigm, through the biocentric one, and ideally towards the ecocentric paradigm, is also discussed, associated with the concepts of deep ecology, as a way of adopting a real and effective protection of the environment and all forms of life that make up the planet. Perhaps then it will be possible to make the provisions of Articles 196 and 225 of the Constitution of the Federative Republic of Brazil - as well as the provisions of international legislation dealing with the protection of the environment - come true; in this desired situation, human beings, non-human living beings, natural resources and the ecosystem as a whole - can finally be fully recognized, respected and preserved, as a fundamental conditions for the existence and maintenance of life and harmony in the ecosystem of this planet.

Compliance with ethical standards

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The Author declares no conflict of interest.

Statement of ethical approval

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